## REMARKS

Claims 1, 4-5, 8-9, 13, 11-12 and 20 are all the claims pending in the application.

Claim 4 has been objected to as being informal. The Examiner states that the upper limit of the recited heating temperature should be 470°C instead of 4700°C, in light of specification and previously filed claims.

In response, applicant has amended claim 4 as proposed by the Examiner. The recitation of 4700°C was a typographical error.

Claims 1, 4-5, 8-9 and 11-12 have been rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-265232 to Kamio et al in view of JP 64-039339 to Sakamoto et al and US 2004/0261615 Yanagimoto et al.

Applicant submits that Kamio et al, Sakamoto et al and Yanagimoto et al do not disclose or render obvious the subject matter of the presently claimed invention and, accordingly, requests withdrawal of this rejection.

The present invention as set forth in claim 1 is directed to a method for producing an aluminum-alloy shaped product, comprising a step of forging a continuously cast rod of aluminum alloy serving as a forging material, in which the aluminum alloy contains Si in an amount of 10.5 to 13.5 mass%, Fe in an amount of 0.15 to 0.65 mass%, Cu in an amount of 2.5 to 5.5 mass% and Mg in an amount of 0.3 to 1.5 mass%.

The aluminum alloy also contains Ni in an amount of 0.8 to 3 mass% and P in an amount of 0.003 to 0.02 mass%, and at least one or a combination of two or more of Mn in an amount of 0.1 to 1.0 mass%, Zr in an amount of 0.04 to 0.3 mass%, V in an amount of 0.01 to 0.15 mass% and Ti in an amount of 0.01 to 0.2 mass%, at least, the aluminum alloy containing Cr in an amount suppressed to not more than 0.5 mass%, Na in an amount suppressed to not more than

0.015 mass%, Ca in an amount suppressed to not more than 0.02 mass% and the balance comprising aluminum and an inevitable impurity.

The aluminum alloy is subject to heat treatment and heating steps, wherein the heat treatment and heating steps include a step of subjecting the forging material to pre-heat treatment, a step of heating the forging material during a course of forging of the forging material and a step of subjecting a shaped product to post-heat treatment, wherein the pre-heat treatment including treatment of maintaining the forging material at a temperature of 200 to 470°C for two to six hours.

Claim 1 requires the presence of both Ni and P, and further requires at least one or a combination of two or more of Mn in an amount of 0.1 to 1.0 mass%, Zr in an amount of 0.04 to 0.3 mass%, V in an amount of 0.01 to 0.15 mass% and Ti in an amount of 0.01 to 0.2 mass%.

Kamio, Sakamoto et al and Yanagimoto et al do not disclose or suggest an aluminum alloy containing both Ni and P as components of the alloy, and do not disclose or suggest the use of the temperature range recited in claim 1 for such an alloy.

Applicant has previously argued that the present invention is patentable over the cited references because the present invention achieves unexpected results.

In the present Office Action, the Examiner states that the results upon which applicant relies are not in the form of a Declaration and, therefore, cannot be used to support applicant's arguments.

In response, applicant encloses an executed Declaration Under 37 C.F.R. § 1.132 establishing that the present invention achieves unexpected results. As set forth in the Declaration, the results in the Declaration contain (a) new examples, which are Additional Examples 1 to 4, and Additional Comparative Examples 1 to 3, (b) Examples 7-2, 7-4 and 7-6,

which are the same as the Examples 7-2, 7-4 and 7-6 set forth in the Appendix Tables 1 to 3 attached to the Amendment Under 37 C.F.R. § 1.111 filed on December 28, 2009, and (c) the data for Examples 5 to 10, 12 and 16 to 23 of the present specification.

The Examples 5 to 10, 12 and 16 to 23 of the present specification, Example 7-2, Example 7-4, Example 7-6, and Additional Examples 1 to 4 are encompassed by the scope of claim 1 of the present application.

Before discussing the Declaration in further detail, undersigned counsel notes that the Declaration contains inadvertent typographical errors. In particular, in Additional Table 3 at page 9 of the Declaration, all three of the Additional Comparative Examples are identified as "Add. Comp Ex. 1." However, the second Additional Comparative Example should be identified as "Add. Comp Ex. 2, and the last Additional Comparative Example should be identified as "Add. Comp Ex. 3, in the same way as the identification of the Additional Comparative Examples in Additional Table 1 at page 5 of the Declaration and Additional Table 2 at page 7 of the Declaration. Applicant will submit a corrected Declaration if required by the Examiner.

All of the Additional Comparative Examples 1-3 were produced at a temperature of 490°C for pre-heat treatment (the homogenization treatment), which is outside the range of the temperature for pre-heat treatment defined in amended claim 1 of this application, and is the minimum temperature disclosed in Kamio et al for the pre-heat treatment (homogenization treatment).

Additional Comparative Example 1 does not contain P and Additional Example 2 does not contain Ni. Namely, Additional Comparative Examples 1 and 2 correspond to aluminum alloys disclosed by Sakamoto et al and Kamio et al, respectively.

Further, the respective amounts of Ni and P which Additional Comparative Examples 1-3 have correspond to the amounts of Ni and P of Examples 16 to 19 of the present specification.

Still further, the amount of P in Additional Comparative Example 3 is within the range disclosed by Kamio et al and the amount of Ni in Additional Comparative Example 3 is within the range disclosed in Sakamoto et al.

The amounts of P and Ni contained in Additional Example 1 are the lower limits of the respective ranges defined in amended claim 1 of this application.

The amounts of P and Ni contained in Additional Example 2 are the upper limits of the respective ranges defined in the current claim 1 of the present application.

The amounts of Ni contained in Additional Examples 2 and 3 are outside the range disclosed by Sakamoto et al (JP 64-039339), that is, are outside the range of the amount of 0.3 to 2.0%, but are within the Ni range of claim 1 of the present application.

Further, the amount of P contained in Additional Example 3 is outside the range disclosed by Kamio et al (JP 2000-265232), that is, is outside of the range of the amount of 0.005 to 0.02 wt%, but is within the Ni range of claim 1 of the present application..

In summary, Additional Examples 2 and 3 are in the respective ranges of the amounts of Ni and P defined by amended claim 1 of the present application, but are outside one or more of the ranges disclosed in Sakamoto et al and Kamio et al.

As can be seen from the Declaration, Additional Tables 1 to 3 show the following facts about the effects depending on the temperature of the pre-heat treatment and the alloy composition.

Based on a comparison between Additional Comparative Example 3 and Examples 16 to 19, all of which examples had the same composition within the claimed Ni and P amounts of

present claim 1, with the amount of P being within the range disclosed by Kamio et al and the amount of Ni being within the range disclosed by Sakamoto et al, and which examples differed only in the temperature of the homogenization treatment, it can be seen that the homogenization treatment at a temperature of 470°C or less leads to the production of a product having higher tensile strengths and fatigue strengths at 300°C than obtained at a homogenization treatment temperature of 490°C, which is the minimum temperature disclosed in Kamio et al for the pre-heat treatment (homogenization treatment).

Based on a comparison among Examples 16 to 19 of the present specification, it can be seen that the lower the temperature for homogenization treatment is, the higher the high-temperature tensile strength and high-temperature fatigue strength are, and that a similar tendency is found among Examples 20, 21 and 23.

As shown in Additional Tables 1 to 3, all of the Examples 5 to 10, 12 and 16 to 23 of the present specification, Example 7-2, Example 7-4, Example 7-6, and Additional Examples 1 to 4, which are encompassed by the scope of amended claim 1 of the present application have compositions within the Ni and P ranges of the present claims and were treated at a pre-treatment temperature within the range of the present claims, have higher tensile strengths and fatigue strengths at 300°C than Additional Comparative Examples 1-3 which either do not have the P or Ni content of the present claims (Additional Comparative Examples 1 and 2, respectively) or which were not treated at a pre-treatment temperature within the range of the present claims (Additional Comparative Examples 1 to 3).

As can be seen from the above, the advantageous effects depending on the temperature of the pre-heat treatment (homogenization treatment) for the alloy of the present invention and the

alloy composition which are described above unexpected and are neither disclosed nor suggested in any of Kamio et al (JP 2000-265232), Sakamoto et al (JP 64-039339) and Yanagimoto et al.

The Examiner recognizes that Kamio et al in view of Sakamoto et al do not expressly teach the claimed preheating (homogenizing) temperature.

The Examiner states, however, that it is well held that discovering an optimum value of a result effective variable requires only routine skill in the art. The Examiner states that in the present case, the pre-heating (homogenizing) temperature is a result effective variable since it affects the forgeability of the forging material and the uniformity of mechanical characteristics of the forged aluminum alloy product, as evidenced by paragraph [0082] of the Yanagimoto et al publication.

The Examiner states that one of ordinary skill in the art, therefore, would have optimized the pre-heating (homogenizing) temperature in the process of Kamio et al in view of Sakamoto et al in order to achieve desired forgeability of the forging material and the uniformity of mechanical characteristics of the forged aluminum alloy product.

In response, applicant submits that while one of ordinary skill in the art may have been led to optimizing within the range disclosed by Kamio et al, one would not have been led to optimizing outside of that range. The Examiner has not responded to this argument.

Further, Yanagimoto et al disclose in paragraph [0082] that the homogenizing can be performed at a temperature of 400°C up to the difference obtained by deducting 10°C from the solidus temperature of the alloy. In the Examples of Yanagimoto et al, a temperature of 490°C was employed for the homogenization. This is the same temperature that is at the lower end of the range of Kamio et al and is the same temperature that was employed in Additional Comparative Examples 1 to 3 of the Declaration, and which did not achieve the results of the

present invention. Accordingly, applicant submits that the Declaration provides evidence of unexpected results with respect to the claimed temperature.

The Examiner states that Kamio et al do not expressly teach a continuously cast rod of aluminum alloy with the claimed composition. The Examiner relies on Sakamoto et al as disclosing a continuously cast rod of an aluminum alloy, which is suitable for forging, with a composition relative to that of the claimed invention, in weight percent, which overlaps the composition of the present claims as shown in a table that the Examiner had prepared.

The Examiner argues that it would have been obvious to one of ordinary skill in the art to use the aluminum alloy cast rod of Sakamoto et al in the process of Kamio et al since Sakamoto et al teach that such an aluminum alloy exhibit excellent wear resistance and forgebility by casting and heat-treating (abstract).

In addition, the Examiner stated that the amounts of Si, Fe, Cu, Mg, Ni, Sr, Mn and Al disclosed by Kamio et al in view of Sakamoto et al overlap the claimed amounts of Si, Fe, Cu, Mg, Ni, Sr, Mn and Al of the instant invention, which is prima facie evidence of obviousness The Examiner argued that it would have been obvious to one of ordinary skill in the art to have selected claimed amounts of Si, Fe, Cu, Mg, Ni, Sr, Mn and Al from the amounts disclosed by Kamio et al in view of Sakamoto et al because Sakamoto et al disclose the same utility throughout the disclosed ranges.

In response, applicant points out that Kamio et al neither disclose nor suggest an aluminum alloy containing Ni. However, the present specification discloses that an aluminum alloy containing P and Ni within the ranges of the composition specified in claim 1 of the present application can be used to produce an aluminum shaped product having excellent high-

temperature tensile strength, according to the present invention, as in Examples 5 to 10 shown in Table 1 of the specification and the Declaration.

Thus, Kamio et al do not render obvious claim 1 directed to an aluminum alloy containing Ni and P.

Accordingly, Kamio et al do not suggest the composition of the aluminum alloy within the scope of claim 1.

The Examiner relies on Sakamoto et al for a disclosure of various components and amounts of an aluminum alloy and argues that it would have been obvious to modify Kamio et al in view of the Sakamoto et al disclosure.

Applicant submits that one of ordinary skill in the art would not have been led to combining the teachings of Kamio et al and Sakamoto et al, and that even if the teachings were combined, one of ordinary skill in the art would not been led to present invention.

Thus, Kamio et al do not disclose the conditions for cooling a molten aluminum alloy when continuously casting the molten alloy.

On the other hand, the invention disclosed in Sakamoto et al requires that the casting temperature range from 670 to 850°C, and the cooling treatment be performed at a cooling speed of 5°C/sec. or higher within the temperature range of from 670 to 554°C and at a cooling speed of 10°C/sec. or higher within the temperature range of from 560 to 554°C (claim 2).

Further, the aluminum alloy used in the invention of Sakamoto et al contains Sr in an amount of 0.005 to 0.1 wt% as an essential component (claim 1), but Sakamoto et al nowhere disclose an aluminum alloy containing P.

On the other hand, while the invention disclosed in Kamio et al indispensably requires an aluminum alloy containing P as stated above, Sakamoto et al do not disclose an aluminum alloy containing P.

Accordingly, one of ordinary skill in the art would not have been led to combining the teachings of Kamio et al and Sakamoto et al.

With respect to the presence of Ni, Sakamoto et al disclose the use of Ni at page 6 of the translation as an optional component in an aluminum alloy that does not contain P, but Sakamoto et al do not contain any working Example of an alloy containing Ni. Thus, in the invention disclosed in Sakamoto at al, Sr is essential while Ni is not essential. In contrast, claim 1 of the present application contains Ni as an essential component.

Since Sakamoto et al do not disclose any inventive example composed of an aluminum alloy containing Ni, it cannot specifically be known from Sakamoto et al how much the addition of Ni to the aluminum alloy composition can increase the strength of a product made of the alloy.

Accordingly, applicant submits that the composition of an aluminum alloy within the scope of claim 1 of the present application and containing Ni and P would not have been not obvious to those skilled in the art from Kamio et al or Sakamoto et al.

In addition, as discussed above, while the aluminum alloy disclosed in Sakamoto et al must be cooled at a predetermined cooling speed as stated above, Kamio et al do not disclose the conditions for cooling a molten alloy. Further, the production method disclosed in Kamio et al is an invention indispensably requiring the use of an aluminum alloy containing P.

Accordingly, it is anticipated that even if the aluminum alloy disclosed in Sakamoto et al is applied to the production method disclosed in Kamio et al, no product having a preferable given strength can be obtained.

Physical properties of an alloy can be completely different depending on the composition and the temperature of heat treatment. In fact, the Examples disclosed in Sakamoto et al, Kamio et al, and Yanagimoto et al as well as the Comparative Examples in the Declaration and the Examples in the Declaration have different properties.

The Examiner has asserted that one of ordinary skill in the art would have been motivated to introduce 0.005-0.02 wt% of P into the alloy of Sakamoto et al, which contains Ni, in order to achieve uniform dispersion of primary phase Si and eutectic crystal Si for desired mechanical strength, fatigue strength and abrasion resistance of the aluminum alloy, by the teaching of Kamio et al.

In response, applicant points out that the question is not whether one would have introduced P into Sakamoto et al. Sakamoto et al is a secondary reference. The introduction of P into Sakamoto et al would not result in the present invention. The question is whether one would have introduced Ni into Kamio et al.

Applicant submits that the Examiner's reasoning is based on a hindsight reconstruction of the present invention based on the disclosure of the present specification. Such a hindsight reconstruction is improper. Moreover, as discussed above, the present invention achieves unexpected results.

In view of the above, applicant submits that the present invention was not obvious to one of ordinary skill in the art from the disclosures of Kamio et al, Sakamoto et al and Yanagimoto et al and, accordingly, requests withdrawal of this rejection.

Claims 13 and 20 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kamio et al (JP 2000265232) in view of Sakamoto et al (JP 64039339) and Yanagimoto et al

(US 2004/0261615) as applied to claim 1 above, and further in view of Evans et al (US 7267734).

Claims 13 and 20 depend from claim 1. Accordingly, applicant submits that these claims are patentable for the same reasons as set forth above for claim 1.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,

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